

Claims

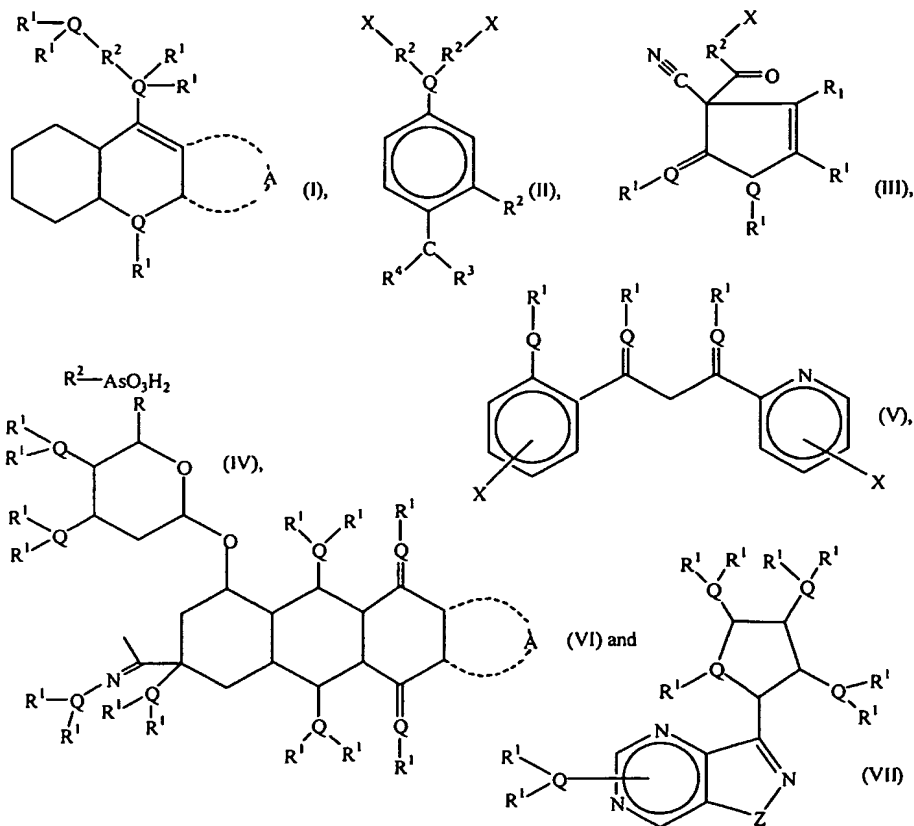
1. A kit for activating gene transfer, said kit comprising a gene transfer activating compound, packaged in a suitable container together with instructions for use to activate gene transfer.

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2. The kit of claim 1 wherein said gene transfer activating compound has a molecular weight of between 300 and 2000.

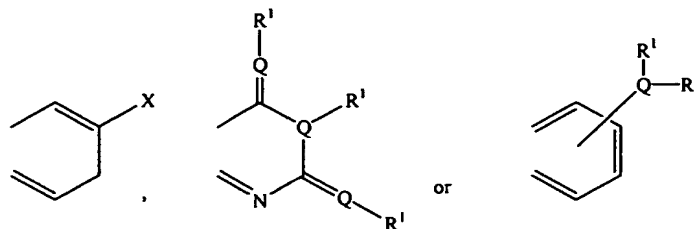
3. The kit of claim 1 wherein said gene transfer compound is selected from the group consisting of:

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wherein Q is nitrogen or oxygen, wherein each occurrence of R^1 independently is H, CH_3 , CH_2CH_3 or a nullity, wherein R^2 is C_1 - C_{18} alkyl, C_2 - C_{18} ether, C_2 - C_{18} thioether, C_2 - C_{18} secondary or tertiary amine,

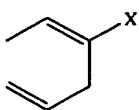
wherein A is



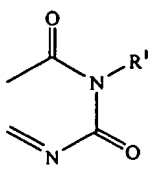
- wherein R^3 is H, C_1 - C_6 alkyl, or a heteroatom substituted C_1 - C_6 alkyl where the heteroatom is oxygen, nitrogen, or sulfur, wherein R^4 is C_2 - C_6 amide, or $=N-R^5$ where R^5 is C_7 - C_{12} aryloxy, C_1 - C_6 hydronyl, carbonyl, carboxyl, or acyl, imidazolyl, pyrazolyl, thiazolyl, or oxazolyl, wherein X is H, F, Cl or Br, wherein Z is oxygen or sulfur.

4. The kit of claim 1 wherein said gene transfer compound is bouvardin.

5. The kit of claim 3 wherein said gene transfer compound is that

of structure I, wherein A is , and Q is nitrogen in each occurrence.

6. The kit of claim 3 wherein said gene transfer compound is that

of structure I, wherein A and each occurrence of Q together are .

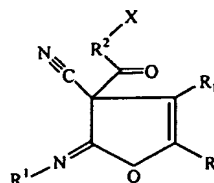
7. The kit of claim 3 wherein said gene transfer compound is that of structure II wherein Q is nitrogen and R^2 is C_1 - C_{18} alkyl.

8. The kit of claim 7 wherein R^4 is $=N-R^5$.

9. The kit of claim 7 wherein X is Cl or Br.

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10. The kit of claim 3 wherein said gene transfer compound is that

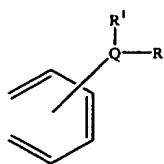


of structure III wherein Q in each occurrence together are

11. The kit of claim 10 wherein said gene transfer compound is that
10 of structure II or VII wherein each occurrence of R^1 is H, or CH_3 .

12. The kit of claim 3 wherein said gene transfer compound is that
of structure V wherein Q in each occurrence is oxygen.

13. The kit of claim 3 wherein said gene transfer compound is that
15 of structure VI wherein Q in each occurrence is oxygen.



14. The kit of claim 13 wherein A is

15. The kit of claim 3 wherein said gene transfer compound is that
20 of structure VII wherein Q in each non-aromatic substituent occurrence is oxygen.

16. The kit of claim 15 wherein R^1 in each occurrence is H.

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17. The kit of claim 3 wherein said compound is selected from the group consisting of: NSC73609, NSC82090, NSC101492, NSC102821, NSC106191, NSC108613, NSC109325, NSC128720, NSC143491, NSC259968, NSC373989 and NSC675865.

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18. The kit of claim 1 further comprising a recombinant gene transfer vector.

19. The kit of claim 18 wherein said recombinant vector is a virus.

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20. The kit of claim 1 further comprising a recombinant adenovirus.

21. The kit of claim 19 wherein said virus is selected from the group consisting of: lentivirus, adeno-associated virus, retrovirus, vaccinia virus, and herpes simplex virus.

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22. The kit of claim 18 wherein said recombinant vector is a plasmid.

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23. The kit of claim 18 wherein the recombinant gene transfer vector comprises a nucleic acid sequence encoding a protein.

24. The kit of claim 1 further comprising a biologically acceptable carrier.

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25. The kit of claim 18 wherein the recombinant gene transfer vector is an oligonucleotide.

26. The kit of claim 18 wherein the recombinant gene transfer vector is an RNA molecule.

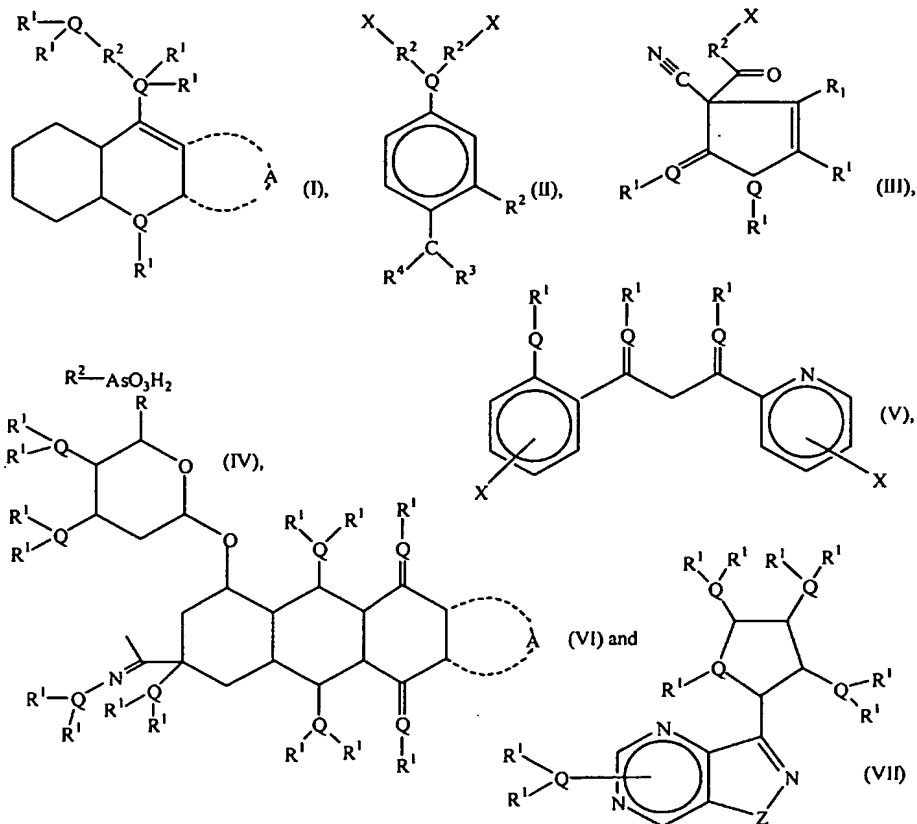
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27. A process for activating gene transfer of a vector to a cell comprising the steps of:

contacting a cell with a recombinant gene transfer vector; and

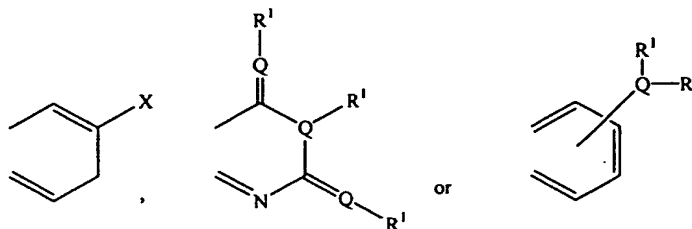
administering a gene transfer activating compound to the cell, such that
5 transfer of the vector to the cell is activated.

28. The process of claim 27 wherein the gene transfer activating compound is selected from the group consisting of:



wherein Q is nitrogen or oxygen, wherein each occurrence of R¹ independently is H, CH₃, CH₂CH₃ or a nullity, wherein R² is C₁-C₁₈ allyl, C₂-C₁₈ ether, C₂-C₁₈ thioether, C₂-C₁₈ secondary or tertiary amine,

wherein A is



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wherein R³ is H, C₁-C₆ alkyl, or a heteroatom substituted C₁-C₆ alkyl where the heteroatom is oxygen, nitrogen, or sulfur, wherein R⁴ is C₂-C₆ amide, or =N-R⁵ where R⁵ is C₇-C₁₂ aryloxy, C₁-C₆ hydronyl, carbonyl, carboxyl, or acyl, imidazolyl, pyrazolyl, thiazolyl, or oxazolyl, wherein X is H, F, Cl or Br, wherein Z is oxygen or sulfur.

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29. The process of claim 27 wherein the gene transfer activating compound is selected from the group consisting of: NSC73609, NSC82090, NSC101492, NSC102821, NSC106191, NSC108613, NSC109325, NSC128720, NSC143491, NSC259968, NSC373989 and NSC675865.

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30. The process for activating gene transfer of claim 27 wherein said cell is selected from the group consisting of: neural, muscle, blood, glial, fibroblast, keratinocyte, hepatocyte, epidermal, endothelial, epithelial and tumor.

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31. The process for activating gene transfer of claim 27 wherein said recombinant vector is a virus.

32. The process for activating gene transfer of claim 27 wherein said virus is adenovirus.

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33. The process for activating gene transfer of claim 27 wherein said gene transfer vector is selected from the group consisting of: lentivirus, adeno-associated virus, retrovirus, vaccinia virus, and herpes simplex virus.

5 34. The process for activating gene transfer of claim 27 wherein said recombinant vector is a plasmid.

 35. The process for activating gene transfer of claim 27 wherein said cell is a human cell.

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36. A process for determining the efficacy of a putative gene transfer activating compound to activate gene transfer, comprising the steps of:

administering a test compound to a first cell;

contacting the first cell with a first amount of a recombinant vector;

15 contacting a second cell with a second amount of the recombinant vector, the second amount of the recombinant vector substantially equal to the first amount;

measuring a gene transfer indicator in the first cell to obtain a test measurement;

20 measuring the gene transfer indicator in the second cell to obtain a control measurement;

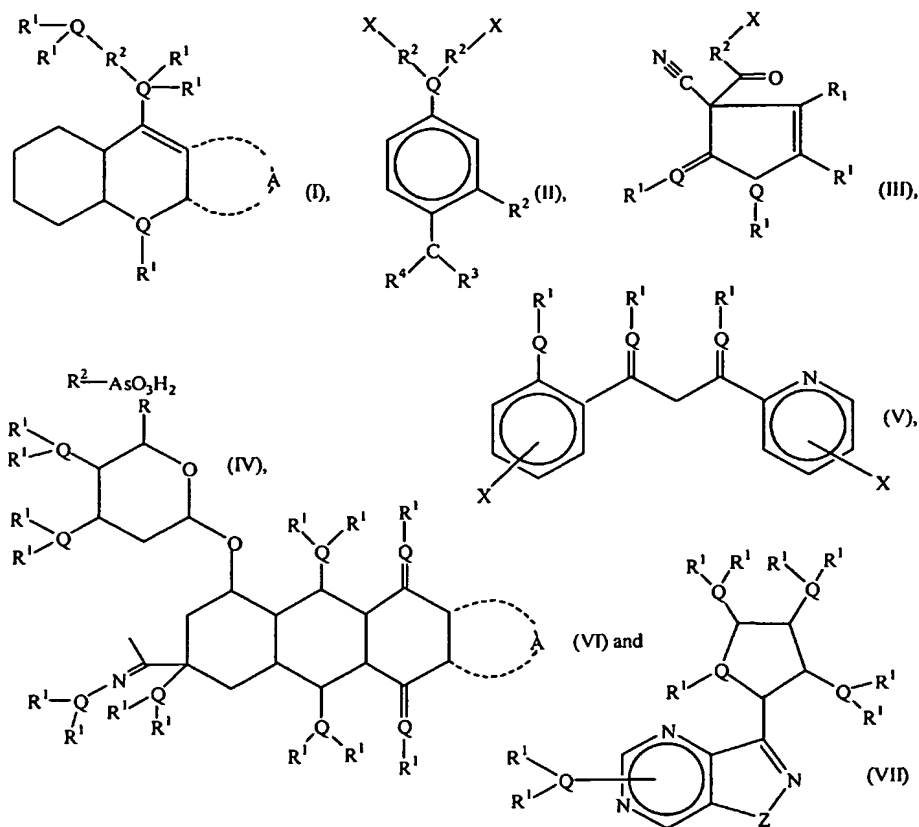
and

comparing the test measurement and the control measurement to determine the efficacy of the putative gene transfer activating compound to
25 activate gene transfer.

37. Use of a compound of Formulae I-VII for use as a gene transfer activating compound.

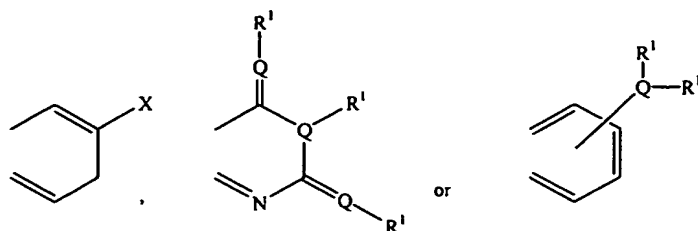
30 38. The use of claim 37 wherein said gene transfer activating compound has a molecular weight of between 300 and 2,000.

39. The use of claim 37 wherein said gene transfer compound is selected from the group consisting of:



wherein Q is nitrogen or oxygen, wherein each occurrence of R^1 independently
 5 is H, CH_3 , CH_2CH_3 or a nullity, wherein R^2 is C_1 - C_{18} allyl, C_2 - C_{18} ether, C_2 - C_{18}
 thioether, C_2 - C_{18} secondary or tertiary amine,
 wherein A is

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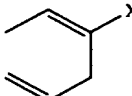


wherein R³ is H, C₁-C₆ alkyl, or a heteroatom substituted C₁-C₆ alkyl where the heteroatom is oxygen, nitrogen, or sulfur, wherein R⁴ is C₂-C₆ amide, or =N-R⁵ where R⁵ is C₇-C₁₂ aryloxy, C₁-C₆ hydronyl, carbonyl, carboxyl, or acyl, imidazyl, pyrazyl, thiazyl, or oxazyl, wherein X is H, F, Cl or Br, wherein Z is oxygen or sulfur.

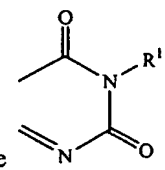
40. The use of claim 37 wherein said gene transfer compound is bouvardin.

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41. The use of claim 39 wherein said gene transfer compound is that

of structure I, wherein A is , and Q is nitrogen in each occurrence.

42. The use of claim 39 wherein said gene transfer compound is that

of structure I, wherein A and each occurrence of Q together are .

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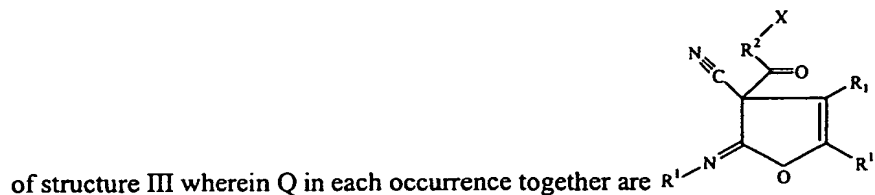
43. The use of claim 39 wherein said gene transfer compound is that of structure II wherein Q is nitrogen and R² is C₁-C₁₈ alkyl.

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44. The use of claim 43 wherein R⁴ is =N-R⁵.

45. The use of claim 43 wherein X is Cl or Br.

46. The use of claim 39 wherein said gene transfer compound is that



5 47. The use of claim 46 wherein said gene transfer compound is that of structure II or VII wherein each occurrence of R¹ is H, or CH₃.

48. The use of claim 39 wherein said gene transfer compound is that of structure V wherein Q in each occurrence is oxygen.

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49. The use of claim 39 wherein said gene transfer compound is that of structure VI wherein Q in each occurrence is oxygen.



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51. The use of claim 39 wherein said gene transfer compound is that of structure VII wherein Q in each non-aromatic substituent occurrence is oxygen.

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52. The use of claim 51 wherein R¹ in each occurrence is H.

53. The use of claim 39 wherein said compound is selected from the group consisting of: NSC73609, NSC82090, NSC101492, NSC102821, NSC106191, NSC108613, NSC109325, NSC128720, NSC143491, NSC259968, NSC373989 and NSC675865.

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54. A process of claim 27 substantially as described herein in any of the examples.